Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands	)	GN Docket No. 13-185
	)	
Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band	)	WT Docket No. 07-195 (Proceeding Terminated)
	)	
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz, and 2175-2180 MHz Bands	)	WT Docket No. 04-356 (Proceeding Terminated)
	)	
Applications for License and Authority to Operate in the 2155-2175 MHz Band	)	WT Docket No. 07-16 (Proceeding Terminated)
	)	
Petitions for Forbearance Under 47 U.S.C. § 160	)	WT Docket No. 07-30 (Proceeding Terminated)

COMMENTS OF MOBILE FUTURE

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COMMENTS OF MOBILE FUTURE

Mobile Future[1] submits these Comments in response to the Federal Communications Commission's ("FCC's" or "Commission's") Notice of Proposed Rulemaking ("NPRM") to make more licensed spectrum available for commercial mobile broadband services under its Advanced Wireless Services ("AWS") rules.[2] The AWS-3 NPRM represents another significant

[1] Mobile Future is an association of wireless technology businesses and non-profit organizations dedicated to advocating for an environment in which innovations in wireless technology and services are enabled and encouraged. Mobile Future, http://www.mobilefuture.org/ (last visited Sept. 13, 2013).

[2] Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands, *Notice of Proposed Rulemaking and Order on Reconsideration*, 28 FCC Rcd 11479 (2013) ("*AWS-3 NPRM*").

step toward making an additional 300 MHz of spectrum available by 2015 and 500 MHz by 2020,[3] implementing the Spectrum Act,[4] and meeting the ever-growing consumer demand for more wireless services. Introducing the AWS-3 spectrum into the mobile marketplace will spur innovation and job creation and help ensure that the United States retains its leadership role in the global wireless economy.

I. INTRODUCTION AND SUMMARY

The U.S. once again leads the world in mobile services, devices, and apps,[5] but continued adoption and demand for wireless broadband makes the introduction of new spectrum into the marketplace critical. Today, nearly 38.2 percent of Americans are wireless-only.[6] Sixty-seven percent of new phones purchased last year were smartphones,[7] an adoption rate that pushed smartphone ownership above 50 percent of all Americans for the first time.[8] And rapid adoption of new mobile apps drive intensive use of cellular data networks.[9] With these developments, mobile data growth remains explosive, and continued LTE deployment and adoption will only intensify these trend lines. This year, wireless data use per connection in the U.S. will exceed

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[3] Presidential Memorandum: Expanding America's Leadership in Wireless Innovation, 78 Fed. Reg. 37431 (June 20, 2013) ("Wireless Innovation Presidential Memo"), *available at* http://www.gpo.gov/fdsys/pkg/FR-2013-06-20/pdf/2013-14971.pdf; FCC, Connecting America: The National Broadband Plan at 84 (Mar. 2010) ("National Broadband Plan").

[4] Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012) ("Spectrum Act").

[5] Comments of Mobile Future, WT Docket No. 13-135, at 6 (June 17, 2013).

[6] Stephen J. Blumberg and Julian V. Luke, Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December 2012 at 1 (Jun. 2013), http://www.cdc.gov/nchs/data/nhis/earlyrelease/-wireless201306.pdf.

[7] Mobile Future, Infographic: The United States of Wireless (June 3, 2013) ("Mobile Future Infographic") *available at* http://mobilefuture.org/resources/united-states-of-wireless-infographic/.

[8] Aaron Smith, Pew Internet & American Life Project, Smartphone Ownership 2013 (June 5, 2013), http://pewinter-net.org/~/media//Files/Reports/2013/PIP_Smartphone_adoption_2013.pdf.

[9] *Cf.* Open Internet Advisory Committee, 2013 Annual Report at 41-42 (Aug. 20, 2013), http://transition.fcc.gov/-cgb/oiac/oiac-2013-annual-report.pdf.

800 megabytes, up from just 307 megabytes in 2011.[10] Through significant infrastructure investments – $35 billion in 2013 alone[11] – sixteen wireless providers now offer LTE service,[12] covering upwards of 90 percent of the country.[13] Rapid consumer adoption of LTE[14] drives higher mobile data usage: the average LTE user consumes 46 MBs a day and 1.4 GB per month.[15] On an annual basis, an average LTE consumer will generate 16.8 GBs of traffic a year – *21 times* more than the average annual wireless data use per connection of 800 MBs.

Additional spectrum is essential to respond to consumer demand and for the wireless ecosystem to continue to drive economic growth and the next wave of mobile innovation. The FCC can make an additional 80 MHz of paired spectrum available for consumer use by adopting the following proposals. First, the Commission should allocate and license federal spectrum in the 1755-1780 MHz and 1695-1710 MHz bands, paired with the 2155-2180 MHz and 2095-2110 MHz bands, respectively. That spectrum should be allocated for exclusive commercial use to the greatest extent possible. The Commission also should work with the National Telecommunications and Information Administration ("NTIA") to facilitate the efficient and smart relocation of federal users from the bands and to minimize the protection zones that constrain commercial use of reallocated spectrum. Finally, the FCC should conduct an open

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[10] Erik Bohlin, Kevin W. Caves and Jeffrey A. Eisenach, Navigant Economics, Mobile Wireless Performance in the EU & the US at 7 (May 2013) ("Navigant Report"), http://www.gsmamobilewirelessperformance.com/GSMA_-Mobile_Wireless_Performance_May2013.pdf.

[11] FCC, Significant FCC Actions and Key Developments in the Broadband Economy at 1 (2013), http://hraunfoss.-fcc.gov/edocs_public/attachmatch/DOC-319728A1.pdf.

[12] Mobile Future Infographic.

[13] Ev Ehrlich, *The Myth of America's Inferior Broadband*, Wall St. J., Aug. 4, 2013, http://online.wsj.com/article/-SB10001424127887324110404578625553817281048.html.

[14] Navigant Report at 21 (noting that nearly 20 percent of all U.S. mobile connections will access LTE networks by the end of 2013).

[15] Rysavy Research, Mobile Broadband Explosion: The 3GPP Wireless Evolution at 9 (Aug. 2013), http://www.4gamericas.org/documents/4G%20Americas%20Mobile%20Broadband%20Explosion%20August%202013%20FINAL.pdf.

auction for AWS-3 spectrum, using a licensing scheme consistent with adjacent allocations and broadband technologies. By taking such actions, the Commission can ensure that the AWS-3 spectrum is made available as quickly as possible to meet growing consumer demand, the needs of our innovation economy, and the future of American technology leadership.

II. THE FCC SHOULD PAIR, ALLOCATE, AND LICENSE THE AWS-3 SPECTRUM TO MAKE AVAILABLE AN ADDITIONAL 80 MHZ OF PAIRED SPECTRUM

The AWS-3 spectrum is comprised of diverse spectrum assets – both federal and commercial, encumbered and clean. The FCC can create an effective band plan for AWS-3 if it pairs these spectrum assets to take advantage of technological synergies and global spectrum harmonization efforts.

A. The Commission Should Work with NTIA to Clear the 1755-1780 MHz Band to the Greatest Extent Possible, Allocate It for Commercial Mobile Broadband, and Pair It with the 2155-2180 MHz Band

The FCC should coordinate with NTIA to clear federal operations from the 1755-1780 MHz portion of the 1755-1850 MHz band to the maximum extent possible. This spectrum is ideally suited to the provision of mobile broadband services. Harmonized internationally for mobile broadband use, access to the 1755-1780 MHz band will allow industry to leverage global economies of scale for equipment development. Located below 3 GHz, the propagation characteristics of the spectrum at 1755-1780 MHz make it ideal for mobile broadband. Further, its location next to the AWS-1 band will produce significant deployment efficiencies and enable the aggregation of larger spectrum blocks. Pairing the 1755-1780 MHz band with the 2155-2180 MHz band would add another 50 MHz of spectrum to the existing AWS-1 allocation to meet consumers' increasing demand for mobile broadband.

1. The Commission Should Work with NTIA to Facilitate An Open Dialogue Between Industry and Federal Agencies on Transition Issues

In order to transition federal users from the 1755-1780 MHz band as rapidly as possible, the FCC should work closely with NTIA to enable an open dialogue between federal agencies and commercial operators early in the transition process. As we learned from the AWS-1 relocation process, a successful relocation process depends on the parties understanding each other's networks and operations.[16] That understanding will enable industry and agencies to better predict the potential for interference, maximize the ability to share spectrum during the relocation and transition process, and assess the likely duration of any transition.

The Commission should work with NTIA to expedite and enhance information sharing and collaboration opportunities between industry and federal agencies. The June 2013 Presidential Memorandum directs NTIA to "continue to facilitate these discussions and the sharing of data [between industry and federal agencies] to expedite commercial entry into [the 1755-1850 MHz band, among others] where possible."[17] To that end, NTIA and FCC must advance the trusted agent process quickly. Specifically, trusted agents should play an integral role in the development of federal transition plans.[18] While the Department of Defense ("DoD")

[16] Testimony of Steve B. Sharkey, Director, Chief Engineering and Technology Policy, T-Mobile USA, Inc. on Creating Opportunities Through Improved Government Spectrum Efficiency before the Subcommittee on Communications and Technology, House Committee on Energy and Commerce, at 5-6 (Sept. 13, 2012) ("Our own experience in relocating Federal users from the 1710-1755 MHz, or AWS-1 band, showed that, while relocation is challenging by nature, it is feasible when all of the parties involved act cooperatively. In relocating Federal users from the AWS-1 band, we found that fundamental misunderstandings of how our respective systems operate led to unnecessarily pessimistic predictions of potential interference. As a result of more detailed technical discussions between T-Mobile and Federal users that took place as part of the relocation process, we were able to build a deeper understanding of how the systems would interact. These discussions resulted in T-Mobile being able to deploy services years earlier than originally anticipated, allowing consumers to benefit from early access to broadband services prior to completing the full transition of the band from Federal to commercial use.… [This experience] points to the importance of a cooperative dialogue that takes into consideration the realistic operations of both the government and commercial operations.").

[17] Wireless Innovation Presidential Memo, 78 Fed. Reg. at 37432.

[18] NTIA also is required by the Spectrum Act to developing templates for the preparation of agency transition plans to be developed in connection with the reallocation of spectrum from federal to non-federal use so it may be

and at least twelve nominees selected as part of the Commercial Spectrum Management Advisory Committee ("CSMAC") working group process have executed nondisclosure agreements,[19] additional work remains to allow individual company representatives to form more direct relationships with DoD or other federal agencies. This type of close integration will improve the understanding of transition-related challenges facing both government agencies and commercial providers.

2. The FCC Should Collaborate with NTIA to Promote Smart and Efficient Relocation Strategies

The FCC and NTIA should work together to develop intelligent transition approaches for federal agencies. In addition, the Commission should follow the Industry Roadmap,[20] and the DoD proposal[21] which provides a clear path between the wireless sector and federal government agencies on spectrum transition issues. The Industry Roadmap recognizes "the legitimate requirements of Government operations" and the need to protect federal operations from "adverse impact," while lowering repurposing costs and facilitating industry access to the 1750-1780 MHz band.[22] The DoD proposal is modestly different from the Industry Roadmap. Between the two proposals, clear direction on relocating government systems, truncating some operations above 1780 MHz, and minimizing remaining use of the band is set forth.

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redeployed to serve consumers. NTIA released a Notice of Inquiry ("NOI") on August 19, 2013, seeking input on a proposed template. *Notice of Inquiry*, Docket No. 130809701-3701-01, 78 Fed. Reg 50396 (Aug. 19, 2013). Mobile Future commends NTIA for timely initiating that proceeding, and is submitting comments in response to that NOI.

[19] Transcript of U.S. Dep't of Commerce CSMAC Meeting at 69 (July 24, 2013), http://www.ntia.doc.gov/files/-ntia/meetings/07242013_doc_csmac_508.pdf.

[20] Industry Roadmap to Assessing the 1755-1850 MHz Band, attached to letter from Steve Sharkey, T-Mobile U.S., Inc., to Marlene H. Dortch, Secretary, FCC, Docket Nos. 10-123, 07-195 (Jun. 24, 2013) ("Industry Roadmap").

[21] Letter from Teresa Takai, CIO, Dep't of Defense, to Larry Strickling, Assistant Secretary for Communications and Information, NTIA (July 17, 2013) ("DoD CIO Letter").

[22] Industry Roadmap at 1.

As recommended in the Industry Roadmap, federal users at 1755-1780 MHz should be relocated into the 1780-1850 MHz portion of the band. Compressing federal operations to the remaining portion of the band will help minimize relocation costs as "the majority of Federal services that operate in the 1755-1780 MHz band also operate in the larger 1755-1850 MHz band."[23] Furthermore, the Government Accountability Office has recognized that "equipment relocation costs vary significantly depending on the relocation band's proximity to the current band. Moving to bands further away than the assumed relocation bands could increase costs relative to moving to closer bands with similar technical characteristics."[24] This thoughtful approach to relocation would limit disruptions to agency operations and long-term planning, and reduce uncertainty for both potential commercial licensees and federal agencies. Alternatively, if these operations cannot be accommodated in the 1780-1850 MHz portion of the band, they should be relocated to other spectrum bands that do not have potential for future commercial use to enable agencies to continue their respective missions.[25] NTIA already has begun reviewing candidate bands in this regard.[26]

In addition, federal agency relocation plans and cost estimates should be more thoroughly examined. Specifically, the NTIA Technical Panel created by the Spectrum Act[27] to review federal agencies' transition plans should assess agency estimates of relocation feasibility,

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[23] *AWS-3 NPRM*, 28 FCC Rcd at 11496 ¶ 32 (citation omitted).

[24] Government Accountability Office, Spectrum Management: Federal Relocation Costs and Auction Revenues, Report to the Committee on Armed Services, U.S., Senate, GAO-13-472, at 21 (May 2013), http://www.gao.gov/-assets/660/654794.pdf .

[25] In the event other spectrum bands must be used to relocate federal users, users with similar operational characteristics should be relocated together. For example, grouping aeronautical mobile telemetry systems together will enable greater efficiencies in the band, as the large protection zones around federal systems increase sharing spectrum challenges with these federal operations.

[26] Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dep't of Commerce, to Julius Genachowski, Chairman, FCC at 3 (Apr. 19, 2013).

[27] Spectrum Act § 6701.

timeframes, and costs to confirm compliance with that statute.[28] NTIA's 1755-1850 MHz Assessment Report described federal agencies' initial assessments of the feasibility and costs of relocating from the 1755-1850 MHz band within ten years or less.[29] Agencies estimated the relocation would cost $18 billion and take over a decade.[30] However, NTIA acknowledges that the Assessment Report did not reflect any independent analysis of federal agencies' estimates.[31] Experience suggests, however, that initial agency estimates may be over-inflated due to a lack of understanding of commercial networks and relocation options. For example, initial government estimates to relocate from the 1710-1755 MHz band were close to $2.2 billion, but those estimated costs dropped to $1.377 billion as the transition approached.[32]

3. Pairing the 1755-1780 MHz Band with the 2155-2180 MHz Band Will Generate Significant Synergies

The FCC should pair the 1755-1780 MHz band with the 2155-2180 MHz band to achieve a symmetrical expansion of existing AWS allocations. This pairing offers significant synergies and is broadly supported by the wireless industry.[33] Base stations already designed for the AWS-

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[28] *Id.* § 6701(a)(3) (amending Section 113 of the National Telecommunications and Information Administration Organization Act (47 U.S.C. 923) by adding subsections (h)(1) and (4)).

[29] John E. Bryson and Lawrence E. Strickling, U.S. Dep't of Commerce, An Assessment of the Viability of Accommodating Wireless Broadband in the 1755-1850 MHz Band at vi (Mar. 2012) ("*NTIA 1755-1850 MHz Assessment Report*"), http://www.ntia.doc.gov/report/2012/assessment-viability-accommodating-wireless-broadband-1755-1850-mhz-band.

[30] *Id.* at iii. More recently, the DoD estimated that clearing operations from only the 1755-1780 MHz band would cost $3.5 billion. DoD CIO Letter at 1.

[31] *NTIA 1755-1850 MHz Assessment Report* at 45-48.

[32] *Compare* John E. Bryson and Lawrence E. Strickling, U.S. Dep't of Commerce, Relocation of Federal Radio Systems from the 1710-1755 MHz Spectrum Band, Fifth Annual Progress Report at 3 (Mar. 2012), http://www.ntia.doc.gov/files/ntia/publications/fifth_annual_report_1710-1755mhz_03302012.pdf with NTIA, U.S. Dep't of Commerce, The Potential for Accommodating Third Generation Mobile Systems in the 1710-1850 MHz Band: Federal Operations, Relocation Costs, and Operational Impacts, Final Report at xviii-xix (Mar. 2001), http://www.ntia.doc.gov/files/ntia/publications/3g33001.pdf.

[33] Verizon Wireless Comments, ET Docket No. 10-142, at 4-5 (July 8, 2011), AT&T Comments, ET Docket No. 10-142, at 5 (July 8, 2011); Ericsson Comments, ET Docket No. 10-142, at 6-7 (July 8, 2011); Sprint Nextel Comments, ET Docket No. 10-142, at 10 (July 8, 2011); T-Mobile Comments, ET Docket No. 10-142, at 6 (July 8, 2011).

1 band can be modified easily to use the 2155-2180 MHz band, allowing operators to quickly deploy this spectrum for consumer use.[34] This pairing also would harmonize U.S. use with international allocations.[35] Harmonizing spectrum allocations enhances roaming abilities, lowers device costs, and reduces interference potential near international borders.

The Commission should license the 1755-1780 MHz and 2155-2180 MHz bands under technical rules similar to the adjacent AWS-1 spectrum. With equal duplex spacing between the uplink and downlink portions of the pairings to the existing AWS-1 pairing, harmonizing the operating rules for the 1755-1780 MHz band with its AWS-1 uplink neighbor and the 2155-2180 MHz rules with the adjacent AWS-1 and AWS-4 downlink rules most efficiently manages the spectrum and would improve economies of scale for mobile device equipment manufacturing. These new spectrum bands share similar signal characteristics with existing AWS-1 spectrum. Indeed, as one analyst noted, "[r]elocation challenges for the two bands are so similar that the FCC requires that both AWS-1 and future AWS-3 license holders share the cost of clearing encumbrances."[36]

B. The Commission Should Reallocate the 1695-1710 MHz Band for Commercial Use Subject to Limited Protection Zones and Pair It with the 2095-2110 MHz Band

The Commission should reallocate the 1695-1710 MHz band segment for commercial broadband, subject to limited Protection Zones necessary to safeguard federal users.[37] The FCC

[34] Comments of CTIA—The Wireless Association, ET Docket No. 10-123, at 5 (June 28, 2010).

[35] International Telecommunications Union, Radio Regulations, RR5-71-72, n.5.388 (2008).

[36] Coleman Bazelon, The Brattle Group, Inc., The Economic Basis of Spectrum Value: Pairing AWS-3 with the 1755 MHz Band is More Valuable than Pairing it with Frequencies from the 1690 MHz Band, at 14 (Apr. 11, 2011) ("Brattle Report") attached to letter from Coleman Bazelon, The Brattle Group, to Marlene H. Dortch, Secretary, FCC, Docket Nos. 10-123, 07-195, 09-51 (Apr. 11, 2011), http://apps.fcc.gov/ecfs/document/view?id=7021237569.

[37] *AWS-3 NPRM*, 28 FCC Rcd at 11546 ¶ 170.

has long recognized this spectrum as having the potential for commercial broadband.[38] Spectrum below 3 GHz is best suited for mobile broadband services,[39] and reallocation would be consistent with efforts at the 2015 World Radiocommunication Conference to harmonize the 1695-1710 MHz band internationally and thus enable global deployment and economies of scale.[40] Pairing the spectrum with another 15 MHz at 2095-2110 MHz would allow the Commission to create another symmetrical expansion of existing AWS-1 allocations.

1. The 1695-1710 MHz Spectrum Should Be Available for Commercial Use Subject Only to Limited Protection Zones

The Commission should follow the CSMAC WG1 Final Report framework recommending the establishment of Protection Zones, within which commercial use would be subject to prior coordination and outside of which such operations could proceed freely.[41] Such a framework "protects incumbent federal operations while maximizing the opportunity for commercial use."[42] Protection Zones better promote the availability of spectrum than the Exclusion Zones originally proposed, which would have prevented commercial operations in those geographic areas. The WG1 Final Report appropriately rejected Exclusion Zones in favor of Protection Zones to enable more commercial use of the spectrum without impacting federal operations. The Commission and NTIA should continue to analyze the size of Protection Zones

[38] *See* National Broadband Plan at 10, 75; Office of Engineering and Technology Requests Information on Use of 1675-1710 MHz Band, *Public Notice*, 25 FCC Rcd 7285 (OET 2010).

[39] As acknowledged by the Commission, "the 3 GHz threshold often [is] identified as the cutoff for ideal spectrum for mobile cellular uses." *See* Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, *Notice of Proposed Rulemaking and Order*, 27 FCC Rcd 15594, 15601 ¶ 19 (citation omitted).

[40] The Advisory Committee for the 2015 World Radiocommunication Conference's ("WRC-15") has recommended that the U.S. champion technical requirements that will precede global allocation of the band for mobile operations on a co-primary basis. FCC Seeks Comment on Recommendations Approved by the Advisory Committee for the 2015 World Radiocommunication Conference, *Public Notice*, 28 FCC Rcd 2016, 2027-28 (IB 2013); *id.* at 2040-42.

[41] Commerce Spectrum Management Advisory Committee Final Report, Working Group 1 — 1695-1710 MHz Meteorological-Satellite, at 2 (Jan. 22, 2013) ("WG1 Final Report"), http://www.ntia.doc.gov/files/ntia/publications-/wg-1_report_v2.pdf.

[42] *Id*. at 2.

to achieve more efficient spectrum management and free up more spectrum for mobile broadband. While the WG1 Final Report improved upon the protection distances included in NTIA's Fast Track report,[43] additional reductions remain possible.

Specifically, the FCC and NTIA, with input from stakeholders, should develop a more accurate and sophisticated model on which to further refine Protection Zones. The revised Protection Zones contained in the WG1 Final Report are a better reflection of proposed commercial LTE uplink operations, the general model used does not take topography or network specifics into consideration.[44] Application of specifics such as terrain and clutter losses can have "a dramatic impact on results" of interference predictions – varying those results "by as much as 40 dB."[45] Continuing to shrink Protection Zones – while enhance appropriate safeguards for federal receivers – will increase the utility of the 1695-1710 MHz band to the benefit of consumers in major markets with existing federal operations, such as Miami, Florida, St. Louis, Missouri, and Sacramento, California, among others.[46]

2. The FCC Should Facilitate an Expedited Coordination Process

The FCC should pursue the WG1 Final Report recommendations regarding coordination methodology. The FCC should work with NTIA to develop an interference prediction model, inputs to the model, and the coordination procedure.[47] Such efforts would help expedite the coordination process and address issues that should be resolved before an auction commences. For example, the FCC should automate the process where possible, so that operations that are not

[43] *Compare* Gary Locke and Lawrence E. Strickling, U.S. Dep't of Commerce, An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands at 4-79 (Oct. 2010), http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf *with* WG1 Final Report, at App. 7.

[44] WG1 Final Report at App. 7

[45] *Id*. at 4.

[46] *Id*. at App. 7, Tbl. 6.

[47] *Id*. at 6.

predicted to exceed the interference power spectral density limits (based on an agreed upon model and underlying inputs) can commence more quickly. In addition, the Commission should consider the methods and lessons learned from the AWS-1 transition process jointly undertaken with NTIA. There, to facilitate the relocation of federal agencies from the 1710-1755 MHz band, the FCC and NTIA set forth procedures for new licensees and relocated federal agencies.[48] Providing guidance to both AWS licensees and federal agencies will enable successful coordination and avoid interference to federal operations during the transitional period.

In addition, as NTIA recommended, a study should be conducted regarding the costs and feasibility of relocating federal operations in the 1695-1710 MHz band segment in the Top 100 markets.[49] By relocating federal receive locations, the FCC and NTIA can free up additional spectrum in the densely populated areas that are the most spectrum-constrained. Increasing spectrum availability in the Top 100 markets also would maximize auction revenue. As the CSMAC WG1 found, "The need for spectrum for commercial services is greatest in heavily populated areas. Accordingly, demand for broadband capacity and services is greatest in these areas and therefore commands the highest interest and anticipated value."[50]

3. The Commission Should Identify the 2095-2110 MHz Band to Satisfy the Spectrum Act's Directive to Auction and License An Additional 15 MHz by 2015 and Pair It with the 1695-1710 MHz Band

The FCC should identify the 2095-2110 MHz band as the additional 15 MHz to be auctioned and licensed under the Spectrum Act.[51] Located below 3 GHz, with ideal propagation

[48] The Federal Communications Commission and the National Telecommunications and Information Administration – Coordination Procedures in the 1710-1755 MHz Band, *Public Notice*, 21 FCC Rcd 4730 (2006).

[49] WG1 Final Report at 7.

[50] *Id*. at 7.

[51] Spectrum Act § 6401(b)(2)(E). Other spectrum bands considered in the NPRM should not be found to satisfy this statutory directive. *AWS-3 NPRM*, 28 FCC Rcd at 11497-98 ¶¶ 36-38. The 1755-1780 MHz band already has been under evaluation for allocation to commercial use for several years, and should not now be considered to satisfy the

characteristics, and adjacent to the AWS-1 downlink band, the 2095-2110 MHz band is ideal for mobile broadband. The Commission should work with NTIA to address interference issues raised by federal and commercial incumbents in the band in connection with the reallocation. For example, compression and other new technologies appear to represent a viable approach to reduce the amount of dedicated spectrum necessary for BAS operations.

The Commission should pair the 1695-1710 MHz band with the additional 15 MHz at 2095-2110 MHz (with uplink at 1695-1710 MHz, and downlink at 2095-2110 MHz, consistent with their respective adjacent spectrum bands). Offering paired spectrum is "in keeping with the leading mobile broadband technologies"[52] and "will allow mobile broadband providers to deploy and expand 4G wireless broadband services quickly and efficiently."[53] This pairing would create a large, contiguous 85 MHz[54] block of spectrum for both uplink and downlink. Spectrum contiguity offers network design synergies and handset design benefits. Large blocks of contiguous spectrum are ideally suited for LTE service, enabling carriers to achieve higher peak throughput and greater overall capacities. Furthermore, pairing spectrum adjacent to similar existing allocations ensures a consistent duplex gap between base and mobile operations throughout the country, mitigating interference and expediting deployment. Finally, paired spectrum generates substantially greater revenues at auction than unpaired spectrum, allowing

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requirement adopted only last year to allocate and license an additional 15 MHz of spectrum. The 1780-1850 MHz band is not a viable candidate for spectrum to be promptly reallocated and licensed, as NTIA and industry are working toward using that band to accommodate federal operations relocated from the 1755-1780 MHz band.

[52] Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, *Notice of Proposed Rulemaking*, 27 FCC Rcd 12357, 12401 ¶ 125 (2012) ("*Incentive Auction NPRM*").

[53] *Id*. at 12405 ¶ 132.

[54] Including the existing AWS-1 allocation, the 1755-1780 MHz and 2155-2180 MHz pairing, and the 1695-1710 MHz and 2095-2110 MHz pairings.

the Commission to more readily achieve Congress' intent of funding FirstNet and reducing the federal debt.[55]

III. AUCTION/LICENSING ISSUES

A. The Commission Should Allow All Qualified Entities to Participate in the AWS-3 Auction

The FCC should adopt an open eligibility standard for the AWS-3 auction.[56] An open eligibility standard is consistent with the Spectrum Act, which prohibits the FCC from excluding any entity who complies with agency procedures and other requirements that are established to protect the auction process, and is otherwise qualified to hold FCC licenses.[57]

Any review of proposed spectrum holdings resulting from the AWS-3 auction should be consistent with the outcome of the Mobile Spectrum Holdings proceeding.[58] The FCC should reject any band-specific or auction-specific limits on spectrum holdings and should continue to evaluate proposed spectrum holdings using the FCC's spectrum screen, updated as necessary to include all spectrum suitable and available for the provision of mobile broadband.[59] Providers contemplating auction participation are entitled to know that, in areas where their spectrum holdings fall below the screen, those holdings will not be subject to further review, and that in other cases, the Commission will appropriately balance the procompetitive effects of spectrum aggregation against any alleged anticompetitive effects. As the provision of advanced wireless services requires large capital investments in spectrum and other resources, a clear, predictable, and transparent framework will help advance mobile growth and opportunities.

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[55] *See e.g.*, Brattle Report at 12.

[56] *AWS-3 NPRM*, 28 FCC Rcd at 11527 ¶ 121.

[57] Spectrum Act § 6404.

[58] Policies Regarding Mobile Spectrum Holdings, *Notice of Proposed Rulemaking*, 27 FCC Rcd 11710 (2012).

[59] Comments of Mobile Future, WT Docket No. 12-269, at 4-7 (Nov. 28, 2012).

B. The Commission Should License the AWS-3 Band in 2x5 Blocks Using EA-based Geographic Area Licenses

The Commission should license AWS-3 spectrum in 2x5 MHz blocks.[60] Five MHz blocks align well with a variety of wireless broadband technologies (*e.g.*, LTE, W-CDMA, and HSPA).[61] By aggregating 5 MHz channels, carriers can enable better performance for LTE service and greater bandwidth capacity through wider channels. Licensing 5 MHz blocks will also increase wireless providers' flexibility in auction bidding.

The Commission should license AWS-3 spectrum blocks on an Economic Areas ("EAs") basis. EAs are most consistent with adjacent spectrum (AWS-1 and AWS-4) license sizes,[62] and can be aggregated to cover larger areas. EAs reflect a suitable and appropriate compromise between Cellular Market Areas and larger Major Economic Areas or Regional Economic Area Groupings. This Commission has acknowledged this middle ground, finding that EAs strike "an appropriate balance between geographic granularity from a spectrum reclamation standpoint and having a manageable number of licenses from an auction design standpoint."[63]

IV. CONCLUSION

The Commission's efforts in this proceeding to "ensure that the speed, capacity, and ubiquity of the nation's wireless networks"[64] keeps pace with consumers' surging demand for wireless broadband deserve praise. Data and market trends consistently and clearly indicate that potent competitive forces in America's mobile marketplace are driving greater wireless use,

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[60] *AWS-3 NPRM*, 28 FCC Rcd at 11501 ¶ 47.

[61] *See, e.g.*, Cellular South Comments, GN Docket No. 12-268, at 7-8 (Jan. 25, 2013); MetroPCS Comments, GN Docket No. 12-268, at 18-19 (Jan. 25, 2013); Verizon Comments, GN Docket No. 12-268, at 60-63 (Jan. 25, 2013); Leap/Cricket Comments, GN Docket No. 12-268, at 4 (Jan. 25, 2013).

[62] 47 C.F.R. § 27.6(h) and (i).

[63] *Incentive Auction NPRM*, 27 FCC Rcd at 12411 ¶ 148.

[64] *AWS-3 NPRM*, 28 FCC Rcd at 11481-82 ¶ 1.

stimulating economic growth, sparking historic levels of capital investment, and providing more consumer choice in the number of services, devices, pricing options, applications, and providers than ever before. Continued adoption of innovative new services and technologies – fuel for the U.S. economy – hinges upon policymakers' taking swift and resourceful actions such as those proposed in this proceeding. Accordingly, the Commission should work with NTIA to facilitate the clearing of federal spectrum bands to the greatest extent possible, and pair and license that spectrum as proposed above. Mobile Future stands ready to assist the Commission in meeting its statutory obligations and responding to consumers' skyrocketing demand for mobile service.

Respectfully submitted,

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